

Main Currents

IN MODERN THOUGHT August 17, 1941.

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Volunteers to digest journals are invited. All are read retroactively as from
October 1st, 1940 to ensure complete coverage. An index of contents will appear
annually, summaries & basic bibliographies occasionally.

MAIN CURRENTS in Modern Thought was originally launched (November 1940) as a cooperative venture in systematic reading over the whole field of knowledge, with a view to reporting the shifting frontier-lines of contemporary thought, meanwhile testing in them outlines of an integration sketched in the original announcement. About thirty readers collaborated and about a hundred subscribers (of various sums) supported the venture initially.

Shortly after MAIN CURRENTS was launched its usefulness became apparent; and without any special effort to make it known, the service was taken up by professors of philosophy, psychology, chemistry, astronomy and other subjects, by artists, teachers, accountants, and so on. At date we have had only a few minor criticisms and much generous appreciation. The first volume will be rounded out by the number dated October 17th, 1941, and the issue of a special Integrated Index. This fulfills our obligation for the year.

The first issues were prepared by the editor, and one or two colleagues close at hand, in an honorary capacity. Issue expenses only have been paid by subscribers. The whole enterprise has grown up in the simplest and most natural way. Readers in India, New Zealand, England and elsewhere now participate and our sources and our coverage do enlarge, despite the war.

Before the new volume starts, a question may be raised. Can we develop our service to meet the needs and standards of a professional public of such diversified interests which has thus come to us? This depends upon the renewal of promises by collaborators for another year. A few read much more than others. To maintain coverage they have burdened themselves. We cannot expect this to continue indefinitely. More readers of source journals are needed.

The reading in comparative philosophy, comparative religion, and comparative general science and in anthropology has been and will continue to be done by the editor and local colleagues. For the present no further provision needs to be made for that. Readers of the principal journals of India --- an area of the highest importance---are being arranged, with headquarters in Bombay. Volunteers in various other fields will be welcome.

Subscriptions for the new volume will be welcome now.

No fixed sum is expected, please. A base of \$5.00 is ideal. A larger amount is, of course, helpful.

Fritz Kunz, Port Chester, New York, or
until September 10th, Craryville, N. Y.

HARVARD SUMMER SCHOOL CONFERENCE

Are Natural & Moral Laws One?

In his opening address, Dr. Kirtley Mather said:- (N. Y. Times, July 21, 1941):-
"The Harvard Summer School Conference on Religion and the World Today is one of many movements spontaneously rising in all parts of the country in recognition of

the fact that these are 'times to try men's souls' as well as men's ability to organize mechanized armies, build more and swifter bombing planes or withstand the tortures of modern warfare. After all, it is the human spirit, whether we think of it in terms of morale or patriotism or integrity of character, rather than brains and brawn alone, that will determine whether this revolutionary crisis of history is to be a dark age of destruction or a new era of reconstruction. Religion may prove even a more potent force in science or technology if men of good-will are intelligently mobilized for protective action."

Dr. J. S. Bixler, now president of Colby College, said:- "I believe that in religion we can find the unifying influence we so greatly need, but it must be religion of a liberal type. That is, it must be a rational, ethical religion purged of superstitious fear, of all obscurantism and reliance on authority and dedicated to the moral ideal which men share because they are men, not because they are Christians, Jews, Aryans or Semites."

The Springfield Republican (August 2nd) reported upon the closing session of the Conference:- "\$10,000,000 endowment for the foundation of an international institute to study the feasibility of a universal planned society is recommended by Prof. Kirtley F. Mather, director of the Harvard summer school. Addressing the final session of a Harvard conference on 'religion and the world today.' Prof. Mather yesterday pictured the institute staffed by the world's leading engineers, philosophers, religionists and educators. These men, he declared, would be free to work unhindered for an ideal democratic society in which war and privation would be ruled out.

'Selection of personnel for such an institute,' he said, "should be based on both mental ability and spiritual quality. Trained minds and practical experience are not enough. Each worker must be committed to the idea that human life is the most important and valuable thing in all the world, that the welfare and happiness of any one individual or group cannot be secured at the expense of any other individual or group."

Conferences such as this, and that in New York City on Religion, Science & Philosophy in September 1940, raise the perpetual question, why should religions and sciences and arts and philosophies be many in learned institutions when nature is one---when man is part of nature, in the largest sense? The answer is that there is no reason whatever for this fractured state of knowledge. No cultured person denies that the world betrays only three types of appearance---energy (matter), self-consciousness (with the potential of conceptual thought), and life. Is there anything else, except the Absolute (in which, as parts, these inhere) that can be conceived or experienced? Fragments---high and precious, but fragments---of knowledge of these three are clearly seen in the Holy Ghost, Father and Son of Christianity. Brahma, Siva and Vishnu of Hinduism without doubt are the same concepts. Practical steps can easily be taken to arrive at a digest of universally accepted laws and concepts of nature on such broad bases.

True, to many all such terminology is folk-lore. To others the Trinity is something apart from ordinary experience, to be known when we pass away from this world. But we would raise the question: How shall the world be united if the religious people do not come to see divinity in this common world of daily life; and if scientific people do not assent to the fact that vast over-riding laws of energy, life and consciousness---one in some supreme sense---are conspicuous summations of nature and men? If we cannot unite these types within our own borders, how can we unite people across national boundaries? Hindus and Buddhists will have to live in comfort with Christians, Jews and Mohammedans in the new era ahead. (At such conferences too often religion is spoken of as if it were only a Judaic-Christian value). How shall the diverse religious moods be united if we cannot first settle whether religion is folklore or not; and whether science can be religious or not?

It is worthwhile to pause long enough to ask ourselves what are our specific American attitudes which constitute obstacles to a union of all peoples, and all cultures. It seems evident that the president of Chicago University, Dr. Hutchins, is right---it is our conceited appraisal of our own modern science which, unredeemed by the higher laws of consciousness, of energy, or life, is still far too arrogant to recognize in Plato, in Shankanacharya, in Jesus, in Buddha, a wisdom we scarcely even appreciate, let alone employ. Another defect is westernism. The two "religions of a book," Islam and Christianity, have denied themselves the help of total truth which the eclectic richness of Hinduism and profound penetration of Buddhism display. Judaism is superior to its Palestinian heirs in this one particular. And, finally, we western extroverts give only lip-service to the causal reality of the subjective worlds.

Dr. Mather and his colleagues have added new force to the hopes we all have of a united world. Is it too much to expect that a continuing bureau, a clearing house for an over-all integration of cultures and attitudes, can be set up at Harvard? Can world-planning be carried on in the religious terms which this group rightly demands unless a simple settlement be made of the basic issue: Either religion is scientific---and if so, what parts of what religions?---or it isn't. Solve this problem and we solve that one problem which (except economic fair play) mankind must solve to live with peaceful hearts.

F. K.

THE STUDY OF MAN, MEDICAL & SOCIAL

A Digest

1st, a combination of intimate, habitual intuitive familiarity with things; systematic knowledge of things; and an effective way of thinking about things is common among medical scientists but rare among social scientists. 2nd, systems in the medical sciences and systems in the social sciences are commonly different. The former resemble systems in the other natural sciences, the latter resemble philosophical systems. 3rd, many of the terms employed currently in the social sciences are of a kind that is excluded from the medical sciences. 4th, sentiments do not ordinarily intrude in the thinking of medical scientists; they do ordinarily intrude in the thinking of social scientists. 5th, the medical sciences have made some progress in the objective study of the manifestations of sentiments; the social sciences, where these things are particularly important, have neglected them. 6th, in the medical sciences, special methods and special skills are many; in the social sciences, few. Finally, seventh in the medical sciences testing of thought by observation and experiment is continuous. Thus theories and generalizations of all kinds are constantly being corrected, modified and adapted to the phenomena and fallacies of misplaced concreteness are eliminated. In the social sciences there is little of this adaptation and correction through continuous observation and experiment.

These are very general conclusions with numerous and important exceptions, particularly in the work of many historians, of purely descriptive writers and of those theoretical economists who scrupulously abstain from the application of theory to practice. [From an article by Professor L. J. Henderson, Harvard Univer. in Science 94, 1-10 (July 4, 1941). A. J. P.]

BENJAMIN LEE WHORF

From the New York Times, July 29, 1941.

[Ben Whorf collaborated in the founding of MAIN CURRENTS and contributed richly, as readers know, to several departments in each issue, even after his strength fell low. His description of the methods he followed in deciphering Mayan will be found after this editorial from the New York Times. Mr. Whorf died July 27th, 1941. The affection of his fellow workers follows him, as we try to close ranks to com-

pensate for his departure. F. K.⁷

"A lesson can be read from the life of Benjamin Lee Whorf. His fellow townsmen of Hartford, Conn., knew him as an executive in one of the city's many insurance companies. But throughout the nation anthropologists, paleontologists and archaeologists esteemed him as one of the inner circle who could decipher and interpret the mysterious writings that remain from the vanished Mayan, Aztec and Toltec civilizations of Central America.

In 1928, when a large part of the American public was concentrating its excess mental energies on crossword puzzles and its excess funds on the even more baffling phenomena of the stock market, Mr. Whorf took up the study of ancient manuscripts from Mexico and points south that had been gathering dust in New England libraries and museums. Soon his contributions to knowledge were recognized by learned societies, which welcomed him to membership. Grants and fellowships enabled him to pursue his studies in Mexican villages near the jungle ruins of bygone Indian grandeur. Yale honored him with fellowships.

Yet throughout all this, and until his untimely death, this scientist continued his conventional calling in the world of business. Here is another instance of the amateur who, by focusing his spare energies on some subject of fascination to him, rose above the humdrum of a daily chore, opened his eyes to new horizons and took pride in making a deposit in the growing fund of human understanding."

Whorf's first decipherments of Mayan were submitted in 1929. His procedure was a combination of linguistics with configurative psychology, based on the recognition of significant patterns. It is essentially the same as was used over a century ago as a clue to the cuneiform inscriptions of Persia, when a scholar recognized, after a word that could be only the name of the king, a pattern of words "X Y X X of Xs", which suggested to him "king, great king, king of kings". Similarly, Whorf began by recognizing a pattern of words accompanying pictures of different individuals holding different objects. He conceived that the pattern would read "John holds X, James holds Y, Mary holds Z, etc."; only in place of John, James, and Mary one should read the names of Maya gods, and for X, Y, Z, names of certain objects. This has proved to be a valuable clue.

In a final paper at a meeting of the Linguistic Society of America, Mr. Whorf translated a series of words accompanying a picture in an ancient Maya manuscript showing the chief Maya god kindling fire with a drill. It is known that this god's name was Itzamna. From work on other texts, a number of phonetic signs have already been deciphered. In this way, signs for H, SH, E, and SA were known. These are found combined under the picture, being an abbreviated way of writing the Maya word hashesa. Here linguistics steps in, and shows that this means "to cause by drilling", being derived from the word hash, which means to drill. Then the name Itzamna is found written out with the characters for I, TZ, MN, and A. In this way all the words of the text are pieced together and found to be a Maya sentence reading "Our lord Itzamna causes fire by drilling". This gives clues to still more texts.

"The Mayas in the opinion of Dr. S. G. Morley of the Carnegie Institute of Washington, D. C., who has spent more than 30 years studying them, "must be regarded as the greatest people who ever lived." Dr. Morley's view is that the greatness of a people should be appraised by their cultural achievements in relation to their material fundamentals of civilization."

"In sensationally startling contrast to not only the Incas and the Aztecs, but to any other known people of all time on a similar level, the Mayas full 2,000 years ago developed a hieratic writing equal to that of the Egyptians, attained the abstract mathematical concept of zero, invented a positional vitesimal (by twenties) system of writing numbers, devised a calendar that was exact to a day within a period of 374,000 years--while the Julian calendar of their Spanish conquerors was 11 days off--learned to predict eclipses, noted exactly to a day within a thousand years the orbit of Venus in relation to that of the Earth, and without the use of fractions (which their mathematics lacked) they calculated the lunar year correctly over fifty-year intervals--a feat involving intricate intercalation since the exact time of the moon's revolution around the earth is 29.53 days."

"Yet Mayas today are among the most backward of all the Indians of the two Americas..."

"There are today approximately a half million pure or very nearly pure Mayas in Yucatan, a few more in the rest of Mexico, and several thousand in Honduras and Guatemala--all the areas comprising some 50,000 square miles, where their empire formerly flourished. Their last empire, nominally a part of the Aztec domain at the time Columbus inaugurated the European discovery and conquest of the Americas, centered in Chichen-Itza and Uxmal, near the modern city of Merida in Yucatan."

"Cortez, after conquering the Aztecs in the Valley of Mexico, invaded the Mayan areas, but the complete Spanish conquest came a little later.....All their culture was exorcized as diabolical, and its immediate disestablishment was pitilessly proclaimed and mercilessly enforced. So far as is known every Mayan book was burned or otherwise destroyed, so that the only Mayan writing that has come down to us is that inscribed on stone."

"With the thoroughgoing disruption of the Mayan empire, even Chichen-Itza and Uxmal were abandoned and by the end of the first century of Spanish rule they were virtually buried in the fast-growing sub-tropical jungle. Of all things Mayan, only the people, their spoken language, and many religious superstitions and customs under the Catholic superimposition persisted."

"A very few of the Spanish did perceive that the Maya was an unusual culture, and so they made some superficial study of it...But no key whatsoever was obtained to the Mayan written language and except for inscriptions on stone, it seems to have perished without a trace."

"The bulk of all inscriptions found on stone are only of dates....(Time has most probably destroyed any of the books--written on perishable paper of a cactus fibre --that might conceivably have survived destruction by the Spanish)."

"At least we know more of the Mayas than of any other people anywhere whose civilization has utterly perished, though of Mayan mystery there assuredly remains aplenty, and it has given rise to many curious theories among those whom the late Professor Munsterberg aptly called "the intellectual underworld." There is a whole literature which puts the key to Maya in books now kept hidden in Tibetan lamaseries

with lost Atlantis and a lost Pacific Island of Mu thrown in. As I recall, these romancers have the Mayas running in unbroken line back to some mighty civilization of 50,000 years."

"I did find one curious fact that might possibly point to some remote connections between Maya and ancient China. Both seemed to have had corn or maize...Now maize is the most domesticated of all common plants. Nowhere so far as is known does it grow wild; what wild plant it evolved from has never been traced definitely; and unlike wheat it will not grow wild...Possibly the ancient Chinese and some other people in Asia and the Mayas developed maize wholly independently of each other--or possibly the Mayas brought it with them from Asia to North America. Most probably, in general anthropological opinion, all the American Indians are of Asiatic origin, migrating in successive waves by way of the Aleutian Islands ten thousand or more years ago."

"But of all varied Indian types the Mayas are about the farthest removed from the Mongolian in appearance. Their noses are peculiarly curved and they evidently regarded this feature as their racial hallmark, for it is emphasized in all their bas-reliefs and sculpture. More unique innate qualities have been revealed by Carnegie Institute medical investigations."

"They have a higher basal metabolism and lower pulse rate (averaging only 52 beats a minute in one group examined) than for either the Cuacasian race or other subtropical peoples. Also various authorities agree that they are probably more lacking in sex-instinct than any other known people. They seem almost utterly passionless, and the few phallic symbols found in their temples were probably an effort to overcome this."

"The present-day Mayas are generally short-lived, the men dying between thirty-five and forty and the women at slightly more advanced ages. Anemia and intestinal diseases are rampant, but they are almost completely free from syphilis--possibly because the disease originated among them (from whence it was carried to Europe) and so a racial immunity has developed in the course of thousands of years. The theory of the American origin of syphilis has been disputed, but it would seem that much valid evidence for it is furnished by the virtual Mayan immunity to the disease, for already some degree of immunity has been developed among the European peoples longest exposed to it."

"Mayan numbers and ideographs are more intricately complex than those of ancient Egypt or China. All the writing, including the numbers was obviously strictly hieratic, that is, religiously esoteric and mystic, without the slightest demotic or common, trace. Alike from ruins and records, it is clear the priests dominated everything and that the masses were kept in total ignorance of all academic culture, although many of them were trained artisans. The famous Mayan calendar was not used by the masses; the popular almanac was a religious cycle of 260 differently named days that had no basis in the astronomical observation of the priests."

"The priestly oligarchy was hereditary, but racially the same as the masses, until the last empire, when there was successively some Toltec and Aztec infusion. There are several indications that Maya started to decline at least a century before Columbus. Maya, Aztec and Inca alike were wholly and completely governed and regimented by hereditary, presbyterial aristocracies: theocratic totalitarianism in its fullest flowering. In every way the Mayas display less zest for life than other of the scores of people I have ever sojourned among. Even the extensive consumption of alcohol, which is very common among all male Mayas, tends only to produce pathetic, unsmiling animation. Indeed, the last incredible aspect of the mystery of Maya is that a living people could so quickly lose all memory or tradition of their past except for spoken language and many animistic superstitions under a new religion imposed by an alien priesthood."

(Reprinted in The Living Age, December, 1940, from Tien H'sia, Chinese literary monthly.
E. L.)

DID EUROPEAN MAN COME FROM THE WEST?

Anthropologists have for some time been using the occurrence of the four basic blood groups as a method of assigning people to older or younger human stocks. It is generally believed that by this method we can cut under all other anthropological features. The following abstract by W. C. Boyd (in Biol. Abs. May, 1941) of an article by J. B. S. Haldane, on The Blood-Group Frequencies of European Peoples (Human Biol. 12 (4), 457-480, 1940) shows that under the races of Western Europe lies the remnants of the primitive European population---Auragnacian and other stocks. "Pooled data are given for the blood group frequencies of 75 European populations, and the results plotted and mapped in various ways. Besides that well known gradient from East to West in which the frequency of B decreases and that of O increases, a striking variation is discerned in the frequencies of A and O among the peripheral populations of Western Europe with low frequencies of B, including Scandinavia, Iceland, Spain, Portugal, Sardinia, and the British Isles. In particular the last are very heterogeneous. These populations with low B are regarded as remnants of a primitive European population." (G. T.)

FROM MANY LANDS, by Louis Adamic

Reviewed by Ruby Radford.

In "From Many Lands" Louis Adamic presents a picture of the foreign-born and their descendants on American soil. To this theme of a square deal for the new American his writings are dedicated. The book is the result of a broadside sent to several thousand people. The questionnaire was also published in several thousand foreign-language newspapers in 1938-1939, with the idea of securing from the foreign-born and their descendants accounts of how they have adapted themselves to the American scene. The main body of the book is given over to the stories of these new Americans; the Finnish Americans, the Jews, Greeks, Armenians, Hollanders, etc. "From Many Lands" is the first of a series of these case histories.

The foreword and a section at the end of the book presents Adamic's purpose and aims more fully: "My purpose as you know, is to begin exploring our American cultural past and to urge the cultivation of its many common fields, not nostalgically, or historically or academically, but imaginatively and creatively, with eyes to the future, until as a people we find and dare to sink our roots into our common American subsoil, rich, sun-warmed and well watered, from which we still may grow and flower."

Long ago Walt Whitman said, "This is not a nation, but a teeming nation of nations." In his fight for a square deal, and a brotherly attitude toward these new Americans Louis Adamic visions a new and far reaching culture: "Most of us, old-stock and new Americans, are not aware of the human resources we have here, and of the opportunity before us to create a great culture on this continent; a culture that should approach being universal or pan-human and more satisfying to the human make-up than any culture that has yet appeared under the sun. Nor are we aware of the dangers ahead of us if we fail to take advantage of this opportunity."..... "What to do? In New York and elsewhere a group of us---we call ourselves the Common Council for American Unity---are working on plans to project some of these ideas into a long-range, statesmanlike movement, which will enlist education, literature, the movies, radio and other cultural forces."..... "There are many things I want to do. I want to stress what I have tried to bring out in My America, namely, that the United States is not anything finished or perfect, but a process in

numerous ways and respects; that the road ahead is long, and that we have to be patient."

(FROM MANY LANDE, Louis Adamic, Harper & Bros., N. Y., 1940, pp. 350.)

MAN'S ACCELERATED LIFE

In an address on Science and Human Prospects by Prof. Eliot Blackwelder, retiring President of the Geol. Soc. of Amer., he states "for perhaps 20,000 years Homo Sapiens was only a savage--in the next 5,000 years he advanced locally to the status of a shepherd--in another 3,000 years he learned to extract and use metals, form cities or states and became skilful in many of the finer arts. Accelerated advance in the next 1,000 years led to books, commerce, literature and philosophy. The last century has witnessed a rapidity of material progress in communication and far flung organization--growth in ideas and complexity of economic and social arrangements. May we assume that the curve will continue to rise indefinitely and at a similar rate? Is there in all geologic or human history any precedent for that? Other animal species of the past have followed career curves that involved a rise culmination and decline. Will our own species also reach its climax and then deteriorate? We have little basis for answers to such questions---a scientist is under no obligation to be an optimist. His only concern must be to approach nearer the truth." [A. J. P. (Science 93, 359-66, April 18, 1941)]

WIDE SPREAD OF FOLSOM MAN

Rough quartzite knives as big as daggers and rough cleavers up to seven inches long, apparently more than 10,000 years old, have been found near Lake Huron in Ontario, by Dr. Emerson F. Greenman of the Univ. of Michigan. Some of the knives are similar to the equipment used by the famous Folsom men of ancient America, and similar knives, semi-lunar in shape have been found in northern Labrador, Quebec province and Alberta. [Science Supplement 93, 14 (May 16, 1941). A. J. P.]

At birth most babies will maintain for a short time definite pitches of C or C sharp, with a range increasing from a quarter tone in the beginning to a major second--a whole tone--at four weeks, a minor third at six weeks, and a major third at eight weeks. In crying, the newborn child always follows a cyclic pattern, starting at the highest pitch and descending to the lowest degree, then, by a skip, approaching the highest tone again. By judging the range of tone in yawning and crying the age of the infant may be fairly accurately ascertained.

The infant responds more readily to low pitched tones, few vibrations, than to those of high frequency, and is even aware of tones--but not as tones--inaudible to the adult ear. If, before the hearing apparatus is sufficiently developed, grave tones are sounded near the infant, he will receive them as shocks and jars and will respond with kicks, jerks and quivers. Response to shrill tones demands a more mature auditory development; thus, hearing grows scalewise.

In the early weeks of life, babies demonstrate a precocious rhythmic sense by accompanying cries and coos with a definite horizontal or perpendicular swing. Regularly oscillating swings accompany a rhythmic cry or coo, while an irregularity of swing accompanies a jerky cry.

Involuntary impulses and emotions, by their intensity of desire and feeling, drive forth utterances which vary in power, pitch, accent, etc. Mr. Harrison states that this "emotional aspect is another of the averred musical elements." The repetition of certain rhythms and tones, shaped into distinct designs has been proved to be sufficiently constant to identify the motivation for any particular cry. In expressing two or more successive desires a child, over one year of age, will frequently combine his cries, thus obtaining a crying range of at least an octave. Three stages are distinct in the vocal phenomenon; the isolative, the agglutinative, and the inflectional, the first two being the basis for the third, inasmuch as the child resorts to stress to compensate for lack of vocabulary. Thus, the varied units of a baby's cry are fundamentally rhythmic constituents.

The infant's sleepy cry demonstrates a perfect diminuendo in which the mildest consonant and dissonant intervals are combined. Comparable to deceptive musical cadences is this cry in which the child tries by a deceptive repulsive attitude to check the onward flow of drowsiness.

In conclusion Mr. Harrison states: "The best music makes the finest adjustment only between the further developed rhythmic sense, tonal concepts and the sanguine passion. It is from these embryonic constitutionals--cries and coos sheathed in rhythm, functioning at various pitches, and garlanded by fervent emotions rising at the nascent vocal awakening, birth, that each sentient being obtains a salient service; inasmuch as these musical elements so evidenced and sustained never dissipate during life." (Hygeia, April, 1941, pp. 338-340. G.B.)

MINERAL METABOLISM, by Alfred T. Shohl

Editorial Review

The American Chemical Society agreed, at the Interallied Conference of Pure and Applied Chemistry, London and Brussels, July, 1919, to issue a series of Scientific and Technologic monographs. As publishers for the Society, the Reinhold Publishing Corporation has been so good as to send this particular volume to us for review, as characteristic of the series. The series includes several works widely mentioned because of their general interest, such as The Vitamins, by H. C. Sherman and S. L. Smith, Photosynthesis, by H. A. Spoehr, and others. The whole undertaking was generously conceived in those more hopeful days after the first part of the Great

War. Perhaps such enterprises, then launched, have come into existence in time to serve humanity when a more durable, economically realistic peace comes along after this part of the Mass Production Revolution has ended? The monographs are written by recognised authorities in each field.

Dr. Shohl is Research Associate in Pediatrics at Harvard. He provides a work conspicuous for comprehensiveness and excellent arrangement, with admirable bibliography and index. The printer provides a format with many merits, not the least the practice of using bold face numerals sufficiently darkened up from the text to make them clear, without annoyance.

Knowledge of the chemistry of the human body has travelled far in the few years since we read (for instance) *Chemistry in Medicine*, by Julius Steiglitz, issued by the Chemical Foundation, 1928. In twenty years knowledge of the important role of trace-elements, the existence of the veritable maze of products from the pituitary, in this field, paralleled by similar gains in other closely related fields, has undergone bewildering enlargement.

The need for over-all integrations in thought becomes that much more conspicuous. Mineral metabolism in man is only a section, a third or a sixth, perhaps, of a subject which involves the operations of self-consciousness or conceptual thought, the constant working of biological laws larger (in the organism) than those chemistry can detect, still larger general laws or ideals in nature (which the reader will find interestingly glanced at on pp. 3-4 of this book, where the author discusses the sea as something very like the human body), and so on. Most of all books of this kind remind us how little we have made up our minds about what time and causality may be, and so on.

For such thinking works of this character are essential. They assemble the data in an orderly way, they have contemporary authority, they enlarge the imagination through the sense of wonder. What is the body, which makes cerebrospinal fluid 99 percent water and tooth enamel with as little as 2 percent (p. 16); cerebrospinal fluid practically devoid of proteins alongside blood so rich in them (p. 22); a gastric juice a million times as acid as the blood (p. 65)? Those of us somewhat acquainted with the literature of these subjects have long been aware that "the body neither provides semipermeable membranes nor acts in accordance with known laws" ---yet without ordinarily identifiable osmotic control it carries on as if it were a laboratory more complex than any man can manufacture---as if it were in fact developed by an Intelligence even if the persons walking round in these laboratories of electrons, neutrons, protons, ions and so-ons are Morons. Philosophers can only be grateful to Dr. Shohl and his colleagues for assembling the data and the references to the literature. All we ask now from the universities are a few Platos, Ph. D.

F. K.

MINERAL METABOLISM, Alfred T. Shohl, Reinhold Publishing Corporation, N. Y. 384 pp. 1939. \$5.00

PERSONAL TIME SENSE

Our personal biological time clock runs at different rates because the pace of life is set by the continuous oxidation or burning of foodstuffs by all living tissues, the brain included. These chemical processes are markedly affected by temperature and Dr. Hudson Hoagland of Clark University has shown that the speed of counting seconds varies exactly with internal body temperature according to Arrhenius' equation after the manner of biological oxidation. If our sense of time duration depends on chemical reactions in the brain cells, by speeding them up, higher temperatures should make subjective or private time pass slowly in comparison

to public or clock time. This was confirmed with a fever patient. In like manner with the slowing of these same chemical processes at lower than normal body temperatures, time would appear to pass faster. (Frozen sleep) Even in sleep our time sense continues to function, but variation in our personal subjective appreciation of duration does not contradict Sir James Jeans' statement "time does not cease to unfold itself at a uniform and uncontrollable rate which is the same for each of us", because the latter meant public time--the time measured by the rotation of the earth on its axis. [Science News Letter 39, 262-3 (April 26, 1941). A.J.P. The foregoing item makes no reference to conscious control in counting seconds through visualization of a clock pendulum and like means, nor whether the subjects of Dr. Hoagland were musicians, for instance. See index, Human Personality, F. W. H. Myers, 2 vol, 1905, for remarkable time sense items. F. K.]

THE UNOBSTRUCTED UNIVERSE, by Stewart Edward White

Extracts

[We print typical sentences from this widely read book, a study of after death conditions which is of interest, and perhaps more readily comprehended, because of its use of electrical and radio terminology instead of mystical terminology. This class of literature needs to be taken much more seriously than is customary among us. A. J. P.]

"Motion is a coexistent of being.--There is motion in everything that exists.--If there is being there is time and space---if you have time space combination you must have motion."---"Your body frequency is so low, you bump against a tree--radio frequency is high enough to go through a tree--the higher the frequency the less the obstruction."---"The facts and conditions resulting from wars--any happenings--remain in time, though the acts have vanished from space.--Receptivity is the essence of time."---"Our matter is the essence of form which is an accompanying attribute of consciousness individualized--our matter is not an obstruction to us."---"You can send an electric shock or X rays through a desk and leave no mark---we can walk through a desk."---"Sleep does not raise our frequency but your receptivity is raised because the contact between the frequency of your material body and of your spiritual self is lessened."---"All that persists individually is that type of consciousness that has acquired volitional reasoning power."---"Radio beams, light, electricity, etc. are degree manifestations of one reality whose highest manifestation of which we are aware is consciousness."

CRYMOTHERAPY

Cryomotherapy, popularly known as "frozen sleep" and "human hibernation" is proving to be an important medical development, which was advanced by Dr. Temple Fay of the Temple University School of Medicine, in Philadelphia. During standard neurological examinations involving skin temperatures at many body sites, he found the lowest body temp. 88-90°F, are along the skin of the extremities below the elbows and below the knees. The question then arose can temperature differences explain differences in the incidence of cancer? Breast cancer has a high incidence whereas cancer rarely spreads below elbow and knees. Later he demonstrated that sustained cold, 40-50°F can retard cancerous growths in the body. In addition prompt and dramatic relief from pain follows local cooling. Experiments with numerous patients showed that lowering the entire body temperature to 90°, resulted in relief from pain for days, slight improvement in general condition of the patient, but no effect on the tumor. Although painless, refrigerated slumber is not altogether peaceful, usually there is continual shivering and much restlessness. After the therapy there is no recollection of the period of cold, or of any dreams. The relief from pain given by the therapy has lead to its use on morphine addicts

who pass their period of deprivation of morphine in refrigerated slumber and afterward seem well able to endure life without drugs, despite years of chronic addiction. To date eight days of unbroken refrigerated slumber, has been the maximum attained. [Barclay M. Newman, Scientific American 97, 286 (May, 1941). A.J.P.]

PHANTOM LIMBS

A Digest

Many problems were faced by psychologists as a result of an estimated 60,000 limb amputations in the first world war, but none perhaps more puzzling than that of the phantom or hallucinated limb appearing after amputation. Extensive studies covering many cases have been reported by D. Katz and others on this as well as other aspects of amputation phenomena; and the subject continues to be of interest as illustrating the ingenious resources of the body in adjusting itself to mutilation or deprivation of its members. In the American Journal of Psychology (October 1940) under the above title S. Feldman of Cornell University suggests an explanation of the basis for the phantom.

It is to be understood in this connection that the hallucination functions in a quite practical way, the subject being able to innervate the biceps and triceps muscles remaining in the stump, by inducing an apparent movement of the phantom arm. And the phantom may also be a factor in the control of the movement of the artificial limb. This does not rest on confusion with the remaining natural limb, for in cases of double amputation confusion is impossible. Yet the phantom still appears. But now it is a double phantom ! Neither can it be offered as a sufficient explanation that the various parts of the body are represented in the brain, for this topographical representation is only one factor in the perception of the body, whether whole or partially mutilated. How, then, are we to conceive the mechanism of adjustment ?

Feldman suggests, paradoxically, that it is the very absence of the limb that is the reason for its perception, on much the same principle that any diseased or malfunctioning part or organ of the body will insistently claim attention. A normal organ, of course, functions quite well below the level of consciousness. And if a limb is perceived after amputation, "it means that an essential condition of its perception has survived: the body continues to adjust itself as if the lever actions formerly exerted by the arm and its several parts were still present. Amputation does not change the body's habitual adjustment."

Also, Feldman adds, considering that the arms are organs of emotional and intellectual expression, it is no wonder that the phantom arm recurs. But when, through freezing or tuberculosis, the use of a limb is lost gradually, no phantom appears, as reported by Gallinek. (Am. Journal of Psychiatry, 96, 1939, 414). In a case reported by Katz in which a limb was lost suddenly the phantom was still present after 56 years !

[No cases are described in detail in Dr. Feldman's article, but references are given in footnotes to the work of Katz published in German, also to Gallinek. Katz' work is reported in: (1) Psychologische Versuche mit Amputierten, Zsch. f. Psychol., 85, 1920, 83-117; (2) Zur Psychologie des Amputierten und seiner Prothese, Zsch. f. ange Psychol., Beiheft 25, 1921, 1-118; (3) Psychologische Erfahrungen an Amputierten, Bericht ii, d. VII, Kongress f. Exper. Psychol., 1922, 49-75, (includes a bibliography of 58 items). E.L.]

INFLUENCE OF THE EARTH ON SOLAR PROMINENCES

A statistical study has been made of Kodaikanal observations of solar prominences during the period 1913-17 and it has been found that the annual variation of the mean daily areas, the mean daily heights and the mean daily bases of prominences at the limb, correspond to the variations of the Earth's distance from the Sun, in the course of the year. In particular it has been found that the maximum of the mean daily areas at perihelion and the minimum at aphelion differ from each other by about 9.6% of the maximum. This has been shown to be evidence of the existence of a terrestrial influence on solar prominences. The effect of planets, other than the Earth, is inappreciable. It is tentatively suggested that the observed influence of the Earth on prominences may well be the result of a tide raising force which varies as the cube of the distance between the Earth and Sun. [A. K. Das, and B. G. Narayan, Indian J. Phys. 14, 311-23 Aug. 1940. The question arises, why only the Earth? A. J. P.]

SUNSPOT DIRECTION

Solar rotation determines the direction of sunspots. (Nature, May 10, 1941, p. 579)

ORIGIN OF THE SOLAR SYSTEM

The paper deals with the tidal theories of the origin of the solar system. In a two-body problem there is no possibility for the formation of the planetary ribbon from which the present planets are supposed to have been developed, by a close encounter or a grazing collision between two stars of usual masses. The theory extended by Lyttleton to explain the origin of the planets is examined mathematically and it is proved that in the most favorable situation for the formation of the planetary ribbon in the three-body problem, at the middle of the collision between the sun's companion and a visiting star, the sun would come so near to its companion and hence to the visiting star, that a very close encounter or collision between them could hardly be avoided. [P. L. Bhatnagar, Indian J. Phys. 14, 253-81 (Aug. 1940) A. J. P.]

COSMIC RADIATION

According to Dr. W. F. Swann of the Bartol Research Foundation, there is only one type of primary radiation---probably protons---comprising particles of heavy mass. By processes at present unknown, the primary radiation gives birth, in the upper atmosphere, to mesotrons. The low energy mesotrons disintegrate in the stratosphere giving rise to electrons which will emerge, on the average, in all directions. The high energy mesotrons, at lower altitudes, give rise to electrons which possess, on the average, a forward component at these lower altitudes. [Physical Review 59, 836 (May 15, 1941) A. J. P.]

COMETARY HYDROGEN

"Hydrogen gas, never before recognized in a comet, has been discovered in Cunningham's comet," "Studying one spectrum plate of the comet, Leland E. Cunningham, . . . and his colleague Dr. Fletcher G. Watson, have found dark bands that seem to show that a comet consists mostly of hydrogen." (Science Supplement, Jan. 3, 1941, Vol. 93 No. 2401, Page 12 R. S.)

Until a few years ago it was thought that plants needed only seven mineral elements, nitrogen, phosphorus, potassium, sulfur, magnesium, calcium and iron, according to Gove Hambridge in "Hunger Signs in Crops". Now the list includes the so-called trace elements, those needed only in exceedingly minute amounts but indispensable in those amounts. They are manganese, boron, chlorine, iodine, zinc and copper. [Science Supplement, 93,10 (May 23, 1941). A. J. P.]

WHERE DOES LIFE ENTER ?

The study of crystals and metals has shown that the single valency electrons cease to belong to one or two atoms only, but lying in energy bands or levels they belong to the whole system. If one of these electrons is raised by absorption of energy to a higher level, an excited state, where it will move and transport its energy freely, it is impossible to say which is the atom to which the electron belongs and the whole system can be considered as activated. By falling back to a lower level the electron will give off its excess energy and perform work in a place more or less distant from that of the absorption of energy. The possibility exists then, that within a protein molecule, built up of a great number of atoms closely packed, conditions analogous to those within crystals may prevail.

The common energy-level theory gives an answer to many unsolved biological problems such as the distribution of energy in muscular contraction, the differences in solubility of oxidation and fermentation enzymes, the interaction of oxidation enzymes, why catabolic processes prevail over anabolic in damaged tissues, why chloroplasts refuse to build up carbohydrates and why viruses refuse to multiply outside the cell.

Even the most involved protein structural formula looks "stupid", but if atomic structure is only the backbone underlying the common energy levels, then it is easier to understand how a protein molecule can "live". A single protein molecule is capable of inducing a sexual change in a whole alga. If the cell forms an energy continuum, any substance approaching at any point, can upset the whole system, making so to say, a hole in the continuum.

Biochemistry is at present in a peculiar state. By means of active substances the most astonishing biological reactions may be produced, but there is failure whenever a real explanation of molecular mechanisms is wanted. It looks as if some basic facts about life were still missing, without which any real understanding is impossible. [Prof. A. Szent-Gyorgyi, Science 93, 609-11 (June 27, 1941). A.J.P.]

ECOLOGY AND SUNSPOTS

The changing populations of many kinds of animals and the alternating yield in the seed crop of plants are phenomena which have been observed during a very long period of history. In many instances the pendulum of numbers swings gently up and down so that periodicity over a course of years becomes evident only after a large amount of quantitative evidence has been collected throughout a considerable time. Wing has applied such data to a study of common North American insects, birds, fishes and mammals and demonstrated by convincing graphs, the regular and repetitive nature of the fluctuations. He correlated his findings with known cycles in the energy output of the Sun and concluded that different species of animals responded to different components of solar activity. [Robert C. Murphy, Science 93, 605 (June 27, 1941). A. J. P.]

"Western civilization has for more than two thousand years sought to establish a rigid separation between reason and emotion, between 'objectivity' and 'values'. The material fruitfulness of the separation in the past is the chief reason for its uncritical acceptance in the present. The intellect, however, is not simply an aspect of human life---and a superior aspect, in typical Aristotelian tradition ---but it arises out of the emotional and ethical life, is deeply rooted in it, and draws its strength and stamina from it. The moral and emotional bleakness of typical intellectual communities, and many of the characteristic problems of the American college and university can only be understood in the light of the persistence of this tradition. When we discuss our 'problems of teaching' and set large staffs at work on the problems of 'youth' and 'teachers training,' we are simply tracing some of the symptoms of a malady that is rooted in this distinction of reason and emotion that underlies most of our thought about the entire education process"

"Occasionally, a teacher in the humanities or the social sciences will venture the statement that the 'relations' of subjects or the 'meaning' of the learning is the heart of good teaching but beyond that point few will risk themselves lest they be accused of 'preaching.' So---in the language of the Sermon on the Mount---while the young clamor for bread, we continue to offer them stones, and if the discontent of the young provokes critical discussion, it is limited to the quality of the stones and to methods of improving methods of manufacturing more excellent stones. . . . The first need is therefore a complete shift of focus. What has partly developed as an unplanned by-product must now be seen as clearly within the general responsibility of the educator. Talent and funds formerly restricted to academic purposes in the narrow sense of the term must now be shifted from sheer cultivation of intellectual virtues to education for the whole man, for men as knowers and doers and appreciators."

"If we in the schools do not live up to our other-than-intellectual responsibility, if we do not reach into moral and emotional fields in a manner that is justifiable from the standpoint of the values of a free society, someone else will. For the need exists, and the trend is toward intensification of the pressures that have brought it about. Thus, in a real sense, the survival of a free society may be determined by the flexibility with which we think of the limits of formal education in a changing world."---Inaugural Address of Harry D. Gideonse as president of Brooklyn College, (Scientific Monthly, August 1941, Vol. LIII No. 2. R. S.)

A COUNTERATTACK FOR DEMOCRACY, by Kimball Young

A Digest

Faced with upheaval from within and without, we are becoming deeply concerned over the preservation of our democracy, of our rights of free speech and free enterprise, of "our way of life" in general, and we ask whether the setting up of the national defense program will jeopardize our individual liberties. Characterized by Mr. Young as "emotionally worried, intellectually befuddled, and partially paralyzed in our will to act," we are seeking the counterattack of democracy to the dangers around us.

In matters of national destiny, two types of attitudes, negative and positive, are displayed by all men. The negative type strives to preserve the old order at all costs, while the positive type is constructive and advanced in its thinking---in a sense even Utopian. There is much to be done in this direction if we have the will to do it.

A basic feature of political representative government is "the conception and

practice by both individuals and groups, of an effective balance between rights and liberties, on the one hand, and duties and responsibilities on the other." People forget too easily that freedom entails responsibility.

In our highly specialized society with its division of labor and its industrialization there has come about a very grave dislocation of power, with its consequent separation of the common man from the one in power. Furthermore it seems that no one is willing to take the responsibility for strong action, not realizing that each failure to face honestly an economic or political problem exposes us to further perils. Without a thought for the rights of unorganized labor, the trade-unionist wanted a monopoly on the labor supply; the business man wanted his liberty but no public responsibility, as did the farmers and professional groups. Democracy's greatest weakness, its most potent threat today, is this "divorce of right from duty, of freedom from responsibility."

Mr. Young sees our problem of national survival as one of morale--morale based on understanding, emotional conviction and action. Under the first factor, understanding, we consider man as a rational being, able to comprehend and analyze. However, because we have carried this process of logic too far without a clear understanding of the principles of human growth, we have lost our old values and have become emotionally unstable.

The second factor of emotional conviction, lying as it does in the realm of the emotions, has been discounted. Neglect of the training of the emotions has resulted in the development of prejudices and popular fads of all sorts. We urgently need a "program for training the emotions and relating them to our intellectual processes in such a way that both may enter into our fundamental beliefs and convictions." Otherwise, an integrated point of view cannot be achieved.

Mr. Young considers this question of morale with reference to:

1. The laboring classes, who, although they have made great strides in organization still have numbers outside the pale. Organized labor, to share in national affairs, must show a greater sense of public responsibility.
2. Agricultural groups to which government aid has been given, although farm laborers have remained unbenefited. In the organization of County Land Use Planning Committees the farmers are developing a sound democratic program.
3. Industrial-business groups in which may be found not only the wealth necessary for expansion but also the requisite leadership, if these groups will (1) understand that close harmony between the political and economic state, together with increased government regulation in international economy is necessary; (2) become convinced of their obligation to society.
4. Professional classes, especially the medical profession, chemists, etc. who have been too slow in assuming public responsibilities.
5. The military personnel, which the U. S. is beginning to recognize as an element in our national culture. However, serious responsibility to the community should be attached to all right granted.
6. Educational groups which, although they are not the overall solution, should still be giving fundamental training for democratic thought and action.

In addition to this, much of our difficulty lies in the fact that our young people, brought up as they have been in a period of depression, have become disillusioned with the whole political and economic setup. They must be given a clear understanding of the forces in operation in the modern world, and be made to realize their duty to constructively influence this social order.

As adult education becomes an ever increasing need, broad community programs should be organized with the twofold purpose of developing, on the one hand, intellectual analysis and judgement, and on the other, an abiding faith and conviction in democratic principles. "If we fail to achieve this orientation, if large num-

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1. The first step in the process of the investigation is the identification of the problem. This is done by the investigator who is responsible for the study. The next step is the formulation of the hypothesis. This is done by the investigator who is responsible for the study. The third step is the design of the study. This is done by the investigator who is responsible for the study. The fourth step is the collection of data. This is done by the investigator who is responsible for the study. The fifth step is the analysis of the data. This is done by the investigator who is responsible for the study. The sixth step is the interpretation of the results. This is done by the investigator who is responsible for the study. The seventh step is the conclusion. This is done by the investigator who is responsible for the study. The eighth step is the presentation of the results. This is done by the investigator who is responsible for the study. The ninth step is the evaluation of the study. This is done by the investigator who is responsible for the study. The tenth step is the dissemination of the results. This is done by the investigator who is responsible for the study.

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1. The first step is to identify the problem or goal. This involves understanding the current situation and what needs to be achieved.

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(The following information was obtained from the records of the Federal Bureau of Investigation.)

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bers of our people continue in, or fall into, a state of doubt, confusion, indecision, and anxiety, we run the risk of losing our very will to live as a nation." (Journal of Adult Education, April, 1941, pp. 126-132. G. B.)

FOR DEMOCRACY

One Billion Allies
Before China Can Win
Warning to Free Nations

A Digest of Three Articles

Fritz Sternberg
I. Epstein
Pearl S. Buck

A proclamation of the British war aims and postwar peace proposals, in putting before the world the basic British views on the question of the democratic New World Order, would be a weapon of inconceivable strength in gaining allies for Britain. According to Mr. Sternberg, although "the one hundred million inhabitants of the conquered countries in Europe are all potential British allies" Britain must make a declaration similar to the following to all of Europe, including the German people who are crushed under Hitler's heel: "We give you the proof positive in our present manner of living and in our present policy that our aim is not the privileges of our island and of its empire, but the cause of freedom for which we now are fighting and which we can achieve if you join us in the battle". (Quoted from "100,000, 000 Allies--If We Choose" by "Scipio").

However, to command confidence in such a declaration, Britain must first prove that her aim is a truly free and democratic New Order in Europe by making her Empire a democratic Commonwealth of Nations; this can be done only by giving India her freedom. Such a step would prove Britain's sincerity and indicate her desire to win as allies, in addition to the one hundred million people in the conquered countries of Europe, the more than three hundred million in British India, the more than four hundred million in free and occupied China, and the more than one hundred million oppressed in Germany and Italy. Thus would be mobilized one billion latent allies for Britain.

As it is perfectly clear that England is lost without American help, the U. S., in return for this very vital aid, can insist that Great Britain make good its claim to waging war for freedom and democracy. Rather than construing this as interference in the internal affairs of another country, it must be realized that this second World War is one of the decisive phases in a world revolution in which we, of necessity, have every interest.

If dominion status for India is the first step in the securing of these allies for the democracies, the liberation of China is the second. In this step, too, Britain and the United States can work together by giving to China war materials and equipment, as tangible proof of their friendship in her military struggle. Furthermore, England and the United States should help China in her political struggle by opposing any kind of appeasement policy and by making it plain that her freedom is part of their foreign policy.

More than this, as both Pearl Buck and I. Epstein show in their comments, it is essential, in China's internal struggle, to extend the frontiers of democracy that the interparty friction and economic exploitation of the peasants may be reduced. Without democratic organization of local power and harmony within, China will be unable to marshal her forces sufficiently to withstand the enemy.

The millions within India and China are being compelled to fight for democracy while they share little or none of the benefits of a national democratic form of government. Let Britain take the necessary steps to liberate India and let the United States and England help in the liberation of China and "the creation of one billion allies in the struggle for victory against the Axis will be a step leading not only to a democratic New Order in Europe, but also to a democratic New Order in Asia as well." (Asia, March, 1941, pp. 155-161. G. B.)